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Electronic Components Production/Test Equipment

France

U.S. DEPARTMENT OF COMMERCE
International Trade Administration

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After several years of minimal growth, directly reflecting the downturn in componentry production, the French electronic components production and test equipment market is now enjoying a renaissance (see table 1 and figure 1). The success of both the electronic equipment makers and the component manufacturers who supply them is opening up opportunities in nearly every category of production/test equipment.

The market for equipment specifically for testing semiconductors appears to be healthy, reaching an estimated $82 million in 1984. By 1987, sales may approach $108 million, with primary products including ATE systems, LSI systems, and microprocessor development test devices.

End Users

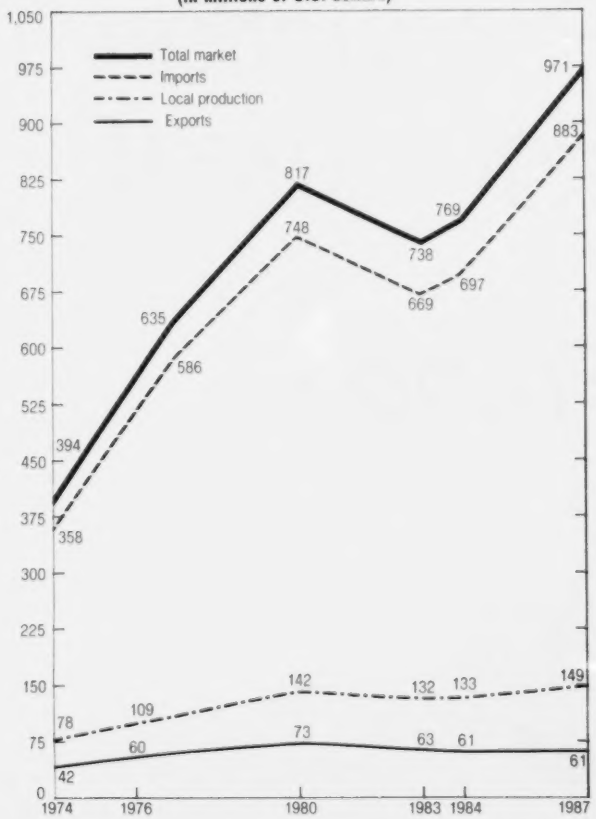
The scores of French electronic components manufacturers produce the entire range of passive components and most actives, creating a market for every kind of production and test device. Most of them, including Sfernice, Deutsch, Boussois-Dan, Ceraver, LCC-CICE, Orega, and many of the smaller firms, produce mainly for the merchant market (see table 2 and the list in the original research). Some of the giant companies, such as Thomson-CSF-BCE, Thomson-CSF-DTP, Matra, ITT Composants, RTC, Entrelec-CGEE, CIT-Alcatel, and AOIP, manufacture primarily for use by their own affiliates or against large contracts, leaving only a residual amount for sale on the open market. The French-based manufacturing subsidiaries of foreign firms make components for their parent and sister companies as well as for the merchant market; these include Siemens, Hewlett-Packard, NEC, Sprague, and Souriau in passives and Intermetall-ITT, Motorola, SGS-Ates, Texas Instruments, and Westinghouse in actives. Group relationships and vertical integration, with their advantages of control, information feedback, and plowed-back profits, have become characteristic of the industry, with Thomson, Matra, SAT, and Souriau characterizing this trend.

Even though the industry depends heavily on foreign, particularly American, licensing and technology transfer agreements, its problems are quantitative rather than qualitative. To date, French component manufacturers cannot keep up with both the buoyant home market and growing export demand, forcing continued reliance on imports (see figure 2). Increased investments in R&D and capital expansion are not expected to bear fruit until nearly 1990. In the intervening years, while producers are trying to catch up, suppliers of components production/test equipment face a promising market.

The dozen or so domestic manufacturers of **semiconductors** and monolithic IC's range in size from RTC's 3,500 workers in this segment to Eurotechnique's 80 employees (see table 3). Market leaders include Motorola, Texas Instruments France, RTC, Thomson-CSF, and Intermetall-ITT, followed closely by Matra-Harris Semiconducteurs, SGS-Ates, and Westinghouse CDSW. The smaller firms, many of them experimental, semicustom designers, include Cogie, EFCIS, Eurotechnique, Laboratories de Marcoussis, TRW, and SSC.

Their production (see table 4a), is heavily geared to export. All have close relationships with end-user companies in the capital and consumer equipment manufacturing sectors, both in France and abroad, and

Figure 1
France: The market for electronic components production/test equipment 1974-87
(in millions of U.S. dollars)



Note: All values are given in U.S. dollars. Local currency is converted at the following exchange rates: US$1 = Ffr 4.81 (1974); Ffr 4.95 (1977); Ffr 5.35 (1980); Ffr 7.62 (1983); Ffr 8.31 (1984); and Ffr 9.90 (1987).

Source: "Market Research Profile on the Electronic Components Production and Test Equipment Market in France," by Tactical Marketing Limited, 73 New Bond Street, London W1Y 9DB, England, May 1985, prepared under contract to International Trade Administration, Export Promotion Services (see Additional Information box).

Table 1.—France: The market for electronic components production/test equipment, 1974-87
(in millions of U.S. dollars)

	1974	1977	1980	1983	1984	Projected 1987
Wafer fabrication equipment						
Production	11	18	23	22	22	24
Imports	31	55	105	116	122	173
Exports (less)	6	10	14	12	12	12
Total	36	63	114	126	132	185
Semiconductor assembly equipment						
Production	7	24	48	44	45	50
Imports	58	124	165	192	227	255
Exports (less)	2	8	19	20	19	23
Total	63	140	194	216	253	282
Passive and other components production equipment						
Production	36	38	36	33	33	37
Imports	137	202	224	172	163	213
Exports (less)	19	24	22	18	17	17
Total	154	216	238	187	179	233
Component test equipment						
Production	24	29	35	33	33	38
Imports	132	205	254	189	185	242
Exports (less)	15	18	18	13	13	9
Total	141	216	271	209	205	271
Total market						
Production	78	109	142	132	133	149
Imports	358	586	748	669	697	883
Exports (less)	42	60	73	63	61	61
Total	394	635	817	738	769	971

Source: "Market Research Profile on the Electronic Components Production and Test Equipment Market in France," prepared under contract for the International Trade Administration, U.S. and Foreign Commercial Service (see Additional Information box).

engage in informational feedback and joint planning of upcoming products. The small number of semiconductor manufacturers also facilitates cordial ties to production/test equipment makers.

American influence is strong, both in actual production and in the technology used by wholly domestic producers. Local firms are steadily gaining assurance, gradually putting their own technical and stylistic stamp on electronics production; by the 1990's, they are expected to be the electronic style leaders in Europe. The sector already has broad technological capability, with equal competence in bipolar, MNOS, and CMOS process technology (see table 4b). Many producers prefer to concentrate on proven, low-technology items, backed up by strong demand from end users in the consumer electronics and consumer white-goods equipment sectors.

Table 2.—France: Purchases of components production/test equipment by end-user sector, 1980-87
(in millions of U.S. dollars)

	1980	1983	1984	Projected 1987
Merchant producers	490	458	492	641
Captive producers	270	236	231	282
Research and other	57	44	46	48
Total	817	738	769	971

Source: International Trade Administration research report.

(Acceptable yields for semiconductor testing at various production stages are shown in table 4c.)

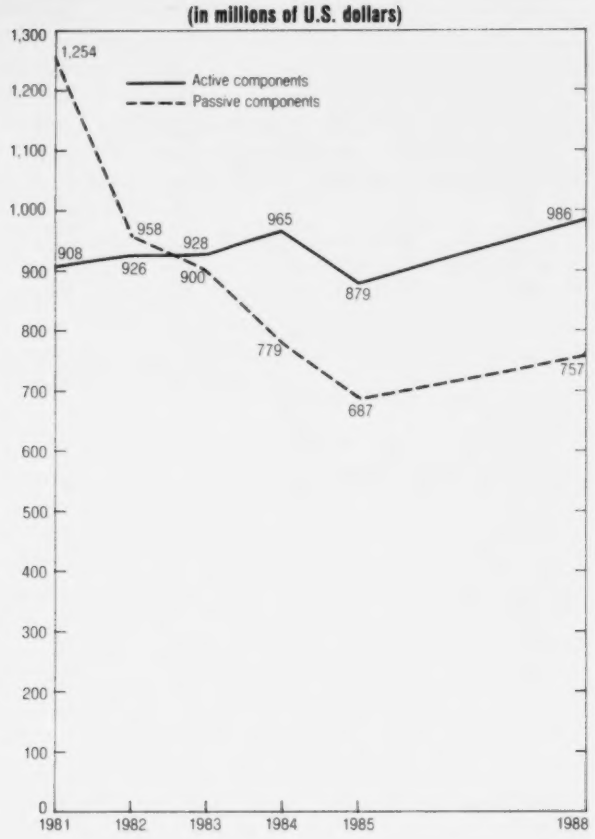
Motorola, an affiliate of the U.S. firm, accounts for about 24 percent of total French production of discrete semiconductors. An experienced multinational, the company has a balanced technological capacity and produces digital IC's in TTL, ECL, MOS, and CMOS. Its diode output includes signal, rectifier, voltage, regulator, voltage reference, varicap, varactor, tunnel, and Schottky. Thyristors, triacs, diacs, and many kinds of transistors are made, such as oscillator, switching, power, field-effect, microwave, bridging, and Darlington. In addition, the firm produces Hall-effect devices, thin-film microdiodes, pressure sensors, temperature sensors, and unmounted chips.

Texas Instruments France pursues a policy of dedicated semiconductor production and accounts for about 12 percent of total domestic output. Products include almost every kind of diode, such as signal, rectifier, voltage, tunnel, Gunn, and Schottky. Thyristors, diacs, and triacs are made, as well as the various popular transistors—amplifier, switching, high-voltage, microwave, dual, and Hall-effect. Microdiodes and sensors are also produced.

The company's technology reflects its volume trade and middle-of-the-road designs. Digital IC production includes TTL, MOS, and CMOS, while memories

Figure 2
France: Production of electronic components, 1981-88

(in millions of U.S. dollars)



appear in bipolar, MOS, and CMOS. R&D capability is good, with ongoing efforts to improve product quality and design.

Intermetall, an ITT company, exploits discrete semiconductor manufacture to satisfy its own in-house demand from other ITT manufacturing units and to take advantage of fast-growing, lucrative worldwide demand. Semiconductors account for about 27 percent of the company's total output and 9 percent of French semiconductor production.

The firm's product program, conditioned by captive demand and volume pricing strategies, is more modest than that of Motorola or Texas Instruments. It includes switching, high-power and amplifier transistors, and a few different diodes, such as signal, rectifier, voltage regulator, and varicap. Technology is also conditioned by the volume factor—digital IC's come in MOS and CMOS, and considerable R&D funds are applied to perfecting IC's for specific uses such as speech synthesis, audiovisual, automotive, telecommunications, and display control.

Thomson-CSF channels almost all its discrete semiconductor activities into its DSD subsidiary, the premier domestically-owned maker of active components. Its technological level is high, backed up by extensive R&D activity and U.S. technology-transfer agreements.

Products include a wide range of diodes—signal, rectifier, voltage regulator, and voltage reference; thyristors, diacs, and triacs; and an even wider variety of transistors—amplifier, switching, high-voltage, power, field-effect, bridging, ring modulation, dual, and Darlington.

The **passives** end of the industry is broadly based and has vast experience in manufacturing volume items either for use in-house or for the merchant market. It covers the entire spectrum, although its major strengths are in capacitors, resistors, connectors, PCB's, ferrites, and transformers.

The component manufacturers' customers, the **makers of capital and consumer electronic equipment,** are themselves end users of test equipment. Many are important purchasers of portable test, analysis, and monitoring equipment, for both factory and field use in maintenance and repair work.

Competitive Assessment

Imports of components production/test equipment supplied more than 90 percent of the market in 1984. Local suppliers are increasing their output, but, with limited capacity and resources, it is highly unlikely they can meet growing demand, especially when significant amounts of their production are diverted to filling increasingly important export orders. All of this points to even greater reliance on imports by 1987, a necessity reluctantly recognized by government officials.

U.S. suppliers.—With their advanced technology, strong marketing, reputation for reliable electronics, and the in-market influence of American multinational end users, U.S. vendors have consistently been the principal overseas suppliers of production/test equipment (see table 5). Opportunities exist in every area (see Best Sales Prospects), with strong demand predicted for the following items:

Complete component assembly centers
CAD/CAE production & design systems
PCB testers
Continuity testers
Annealing furnaces
Flow soldering equipment
Logic analysers
Wafer-making devices of all types
High-resolution microscopy equipment
Optical inspection devices
Automatic devices for pin & probe insertion
In-circuit function testers
VLSI test systems

In CAD/CAE systems, demand is likely to be unduly strong in gate arrays, for custom IC's, and for application-specific IC development projects.

Table 3.—France: Economic indicators of major end users, 1983
(in millions of U.S. dollars)

Company	Workers		Factories		Production		Investment		R & D	Components produced
	Domestic	Foreign	Domestic	Foreign	Total $	Semicdr.	Capital (US$ million)*	Components prod. eqpt. (US$ million)*	Expenditure (US$ million)*	
RTC La Radiotechnique Compelec SA	7,000	—	3	—	147	16	6.8	1.1	.7	Diodes, thyristors, transistors, sensors, microwave devices, digital IC's, memories, microprocessors, microcomputers, analog IC's, custom IC's, microwave hybrids, memory cards, gate arrays, IFL, applc'n IC's
Motorola Semiconducteurs SA	2,095	—	1	—	298	23	12.3	3.6	1.3	Diodes, thyristors, transistors, sensors, unmounted chips, digital IC's, memories, microprocessors, microcomputers, interfaced IC's, analog IC's, custom IC's, microwave hybrids, memory cards, development systems, gate arrays, application IC's
Texas Instruments France SA	1,800	—	1	—	72	20	3.3	.9	.5	Diodes, thyristors, transistors, accessories digital IC's, memories, microprocessors, microcomputers, interfaced IC's analog IC's, custom IC's, microwave hybrids, development systems, gate arrays, applc'n IC's, image sensors
Intermetall SA	1,600	—	1	—	56	15	2.9	.9	.3	Diodes, transistors, digital IC's, memories, microprocessors, microcomputers, interfaced IC's, analog IC's, custom IC's, development systems, applc'n IC's
Thomson-CSF/DSD	700	400	1	1	12	12	.7	.3	.3	Diodes, thyristors, unmounted chips, accessories
Thomson-CSF/DCI	600	—	1	—	35	3	1.6	.5	.4	Diodes, digital IC's, memories, microprocessors, microcomputers, analog IC's, custom IC's, memory cards, development systems, gate arrays, applc'n IC's
SGS-Ates France SA	500	2,135	1	3	18	5	.9	.2	.2	Discrete semiconductors, IC's memory cards

Table 3.—France: Economic indicators of major end users, 1983 (continued)
(in millions of U.S. dollars)

Company	Workers Domestic	Workers Foreign	Factories Domestic	Factories Foreign	Production Total $	Production Semicdr.	Investment Capital (US$ million)*	Investment Components prod. eqpt. (US$ million)*	R & D Expenditure (US million)*	Components produced
Westinghouse-Cie des dispostifs semiconducteurs Westinghouse	470	—	1	—	5	5	.3	.1	.1	Diodes, thyristors, transistors
EFCIS (Thomson-CSF)	210	—	1	—	18	3	.7	.1	.1	Diodes, IC's, memory cards
Laboratoires de Marcoussis (CGE)	200	—	1	—	9	3	.3	.1	.1	Discrete semiconductors, IC's, optoelectronics microwave transistors, unmounted chips
TRW Components Electroniques	150	—	1	—	3	2	.1	.03	.02	Diodes, transistors, thyristors, microwave hybrids
Matra-Harris Semiconducteurs SA	300	—	1	—	13	5	.5	.1	.07	Transistors, IC's, memory systems
Cogie SA	110	—	1	—	2	2	.1	.03	.02	Diodes, thyristors, transistors, unmounted chips
SSC-Le Silicium Semiconducteur SA	NA	—	2	—	5		NA	NA	NA	Transistors, diodes

* Componentry only.
Source: International Trade Administration research report.

American sources of semiconductor assembly equipment include Norland, Tridak, Universal Instrument, and Rotec (see list of Leading Suppliers). Wafer fabrication equipment is provided by Universal Instrument, Shuttleworth, and Rotec, among others; GenRad, Gyrex, and Keithley supply components test equipment; and passives and other components production devices come from Autosplice (microcomponent automative inserters); Branson (ultrasonic cleaning systems and assembly machinery); Systemation (IC and passives assembly equipment); and Advanced Controls (PCB manufacturing systems).

Third-country suppliers.—Germany counts on its EEC status, good aftersales service, and reputation for reliable, medium-technology items to garner second place in imports, although this share is expected to erode by 1987 under pressure from Far Eastern suppliers. German vendors provide semiconductor assembly equipment (Siemens, Kissel & Wolf); components test devices (Bosch, Siemens); and passive components production equipment (Siemens, Zevatron, Streckfuss, Grassmann, Bruckner, and Boll, among many others).

The Swiss, with an excellent reputation for precision products designed for long reliable use, are expected to gradually price themselves out of the market. Active sellers of components test devices include Kulicka & Soffa and Erem. Messerli, Kulicka & Soffa, Erem, and Harlacher are strong providers of wafer fabrication equipment.

The Japanese are projected to increase their modest share of imports to 10 percent in 1987 through persistent marketing efforts and close attention to customer requirements. Companies such as Fuji Machine and Chuo Tsusho emphasize sales of semiconductor equipment.

Merchants from Italy and the United Kingdom also have relied on their EEC status to gain entry to the market. The Italians have some price advantages, while British firms are strong in certain product designs. Both expect their import shares to decline somewhat under pressure from the Japanese. The Dutch, with their broad and attractive product range and sensible price strategy, expect to hold onto their 5-percent share of imports, aided by the captive trading of the giant Philips.

Local suppliers.—Domestic manufacturers provide little quantitative competition for foreign vendors, meeting only a small portion of home demand, even though production rose 9 percent in 1984 (see table 6; the original research gives a complete list with addresses and some company information). Local suppliers are well diversified and have a reputation for

reliable, attractively styled products, even if not always boasting state-of-the-art technology and design. Many are both importers and manufacturers, including Ste Electrique Sterling, Comatel, CCI, and Lequay. Others, such as CIT-Alcatel, Matra, ITT,

Table 4a.—France: Production of semiconductors, 1980-87
(in millions of U.S. dollars)

	1980	1983	1984	Projected 1987
Discrete semiconductors	159	168	178	163
Optoelectronic devices	50	51	55	53
Bipolar IC's	64	78	85	78
Hybrid IC's	69	78	87	91
MOS logic	94	89	90	91
MOS memory	104	96	100	93
Totals	540	560	595	569

Source: International Trade Administration research report.

Table 4b.—France: Semiconductor manufacturing profile, 1983-84
(in percentages)

	1983	1984
Wafer size		
100 mm	11	10
125 mm	15	17
150 mm	59	53
larger than 150 mm	15	20
	100	100
Level of integration		
Discrete	18	15
ICs	26	28
SSI/MSI (under 100 gates/chip)	22	16
LSI (100-998 gates/chip)	20	26
VLSI (1,000 or same gates/chip)	14	15
	100	100
Process technology		
Bipolar	37	30
NMOS	37	36
CMOS	26	34
	100	100
Packaged technology		
Dual in-line packaging (DIP)		
Plastic	50	50
Ceramic	35	30
Other	15	20
	100	100
Die attachment		
Eutectic bonding	38	45
Epoxy	41	40
Other	21	15
	100	100
Bonding wire		
Aluminum	85	80
Gold	5	10
Other	10	10
	100	100
Number of pins/grid (PGA)		
Below 20	48	40
20-40	40	50
Over 40	12	10
	100	100

Source: International Trade Administration research report.

Table 4c.—France: Semiconductor testing profile, 1983

Production stage	Acceptable yield (%)
Microlithography	98
Etch and strip	96
Ion implantation/diffusion	95
Deposition	95
Assembly	98

Source: International Trade Administration research report.

Table 5.—France: Imports of components production/test equipment, 1980-87
(in millions of U.S. dollars)

	1980	1983	1984	Projected 1987
Wafer fabrication equipment				
United States	41	49	50	69
Germany	20	24	26	
United Kingdom	19	11	12	
Japan	11	7	8	
Italy	10	6	7	
Others	4	19	19	
Total	105	116	122	173
Semiconductor assembly equipment				
United States	80	86	98	101
Germany	23	35	48	
United Kingdom	14	13	20	
Japan	15	13	18	
Italy	12	5	8	
Others	21	40	35	
Total	165	192	227	255
Components test equipment				
United States	76	73	65	97
Germany	48	45	40	
Italy	40	34	30	
United Kingdom	17	20	21	
Japan	16	11	10	
Others	57	6	19	
Total	254	189	185	242
Passive and other components production equipment				
United States	62	54	51	86
Germany	98	48	47	
United Kingdom	23	21	16	
Italy	6	12	15	
Japan	17	12	12	
Others	18	25	22	
Total	224	172	163	213
Total imports				
United States	259	262	264	353
Germany	189	152	161	
United Kingdom	73	65	69	
Italy	68	57	60	
Japan	59	43	48	
Others	100	90	95	
Total	748	669	697	883

Source: International Trade Administration research report.

Texas Instruments, Siemens, and Bosch, as large makers of active components that started making instrumentation for their own in-house use and then set up subsidiaries to market the equipment more

Table 6.—France: Major domestic manufacturers of components production/test equipment, 1983
(in millions of U.S. dollars)

	Employees (in-country)	Production: Semiconductor prod./test equip.	Production: All	Exports	Capital investment
Ste. Electrique Sterling	400	1.6	14.3	6.7	.6
OSL-Outillage Scientific et de Laboratoires	162	1.7	9.8	5.8	.4
Sormel	145	1.9	7.4	4.6	.3
Cie Franciase de l'Etain	130	.9	6.3	3.1	.3
Comatel	120	2.4	3.7	2.4	.2
Jean Loupot SA	98	.7	3.2	2.1	.1
Matra GCA	59	5.3	—	1.3	.2
CIT-Alcatel	171	8.5	1.3	3.3	.4

Source: International Trade Administration research report.

widely. Still others confine themselves to production/test equipment production. Most of the firms are small or medium-sized, with no single supplier holding a dominant position. The full market effects of the new Alcatel-Thomson company, which was formed by government directive to unify activities in certain product areas, are not expected to be felt until 1986/87.

Production equipment for passives is the industry's area of greatest experience and credibility, although semiconductor production equipment has become the area of greatest output in the past few years. The dominant technologies are now purely electronic. Optical analysis and ultrasonic testing systems are growing, but not as swiftly as laser technology. In automatic component insertion, especially in micro-diode and other subminiature assignments, French output lags behind that of American and Japanese makers. Except for large firms like CIT-Alcatel and Matra, few manufacturers are making big commitments to research and development.

Exports, which absorbed 46 percent of 1984 production (see table 7), have high official priority even at the expense of domestic penetration. Local producers are especially trying to expand their shipments of semiconductor testing equipment. Reexports may be as high as 11 percent of imports, mostly from U.S. sources, but are expected to decline to 5-7 percent as local technology and design capability increases, representing mainly the activities of foreign multinationals based in France.

Business Practices

Domestically produced components production/test equipment is sold directly by the manufacturer to the buyer. Imported goods are sold by the accredited importer or, for small devices, by merchants acting as distributors. The existing network of importers and agents is effective and easily available to prospective foreign shippers. (A complete list will be found in the original research, as well as trade publications, associations and exhibitions.) Alternative sales routes for new-to-market American vendors include joint ventures with manufacturers already established in the market, licensed manufacture by one of the domestic equipment makers, in-market manufacture by a wholly owned subsidiary (which would qualify for EEC status), or in-market wholly owned sales subsidiaries capable of serving both the domestic market and surrounding European markets.

Reliability and suitability are the primary criteria in

Table 7.—France: Exports of components production/test equipment, 1980-87
(in millions of U.S. dollars)

	1980	1983	1984	Projected 1987
Wafer fabrication equipment				
United States	4	4	4	0.4
Germany	2.4	2.0	2.0	
United Kingdom	2.2	2.0	1.6	
Italy	6	7	1.2	
Belgium	6	.5	6	
Others	7.4	6.5	6.6	
Total	13.6	12.1	12.4	12
Semiconductor assembly equipment				
United States	2	3	2	.4
Germany	3.0	3.1	3.2	
Italy	1.9	1.6	1.4	
Netherlands	1.7	1.2	1.4	
Belgium	1.5	1.2	1.3	
Others	11.0	12.7	11.8	
Total	19.3	20.1	19.3	23
Components test equipment				
United States	1.3	1.4	1.7	1.3
Germany	4.3	4.7	3.4	
Middle East	4.1	1.3	2.5	
Italy	3.4	2.4	2.4	
United Kingdom	2.1	2.2	1.1	
Others	2.2	.7	.8	
Total	17.4	12.7	11.9	9
Passive and other components production equipment				
United States	2.6	1.4	1.2	1.5
United Kingdom	3.6	2.8	4.7	
Germany	5.0	2.5	4.1	
Netherlands	2.2	1.4	1.7	
Belgium	1.5	1.3	1.6	
Others	7.3	8.7	4.1	
Total	22.2	18.1	17.4	17
Total exports				
United States	4.5	3.5	3.5	3.6
Germany	14.7	12.3	12.7	
United Kingdom	7.9	7.0	7.4	
Italy	5.9	4.1	5.0	
Belgium	3.6	3.0	3.5	
Others	35.9	33.1	28.9	
Total	72.5	63.0	61.0	61

Source: International Trade Administration research report.

the purchasing decision. Price and financing terms are usually less important than timely deliveries and good training and support services.

U.S.-sourced products carry tariffs up to 7.6 percent, while goods from EEC producers incur no duties. Because of the dominance of American electronic hardware, the French industry is comfortable with U.S. standards. In semiconductor manufacture, silicon wafers are still measured in inches rather than in metric dimensions. Certificates of origin are required in import documentation, with certificates issued by American chambers of commerce accepted for this purpose. Import licenses are generally not required, but it is advisable for electrically operated equipment and machinery to conform to French safety standards.

Leading Suppliers

Company	Country of mfgr.	Products
Wafer fabrication equipment		
Comatel	France	Wafer making devices
Laser Systems	France	Wafer making systems
Leguay SA	France	Substrate handling equipment
Renault Automation	France	Wafer fabrication equipment
Argon Industrie Mecchaniche	Italy	Substrate handling equipment
Aurel	Italy	Wafer making devices
Diamant	Germany	Saws
Dyna-Pert	Germany	Substrate handling equipment
Erem France	Switzerland	Wafer making systems
Grauel & Co. KG	Germany	Wafer making systems
Gustav Wirz	Switzerland	Wafer preparation equipment
Harlacher AG	Switzerland	Wafer making systems
Kissel & Wolf	Germany	Wafer making systems
Kulicka & Soffa	Switzerland	Wafer preparation equipment
Loadpoint	U.K.	Dicers
Messerli SA	Switzerland	Substrate handling equipment, dicers, saws, photoresist monitors
Rotec	U.S.A.	Wafer saws
Shuttleworth Europa	U.S.A.	Wafer fabrication equipment
Universal Instruments	U.S.A.	Wafer fabrication equipment
Zevatron France	Germany	Substrate handling equipment
Semiconductor assembly equipment		
CBC Electronique	France	Photolithography equipment
CDI	France	Wet benches and bonding equipment
Comatel	France	Printing, burning and assembly machines
Cryophysics SA	France	Marking machines
Emile Joly	France	Encapsulators
Fisa	France	Cleaning equipment
MJB	France	Cleaning equipment
Plastacid	France	Wet benches and cleaning equipment
Promosol	France	Bonding devices
Renault Automation	France	Substrate handling and soldering equipment
Sormel	France	Wet benches, dicing, bonding and marking equipment
Ste. L'Equipment Electronique	France	Burning and encapsulkating equipment
Sulzer Electro Technique	France	Trimming machines
Weeq SA	France	Transfer and soldering equipment
Advanced Semiconductor Materials BV	Netherlands	Encapsulation equipment
Branson Europa BV	Netherlands	Cleaning equipment (U/S)
Chuo Tsusho Kaisha	Japan	Soldering and transfer equipment
Electrovert	Canada	Cleaning and soldering equipment
Fuji Machine Mfg. Co.	Japan	Soldering equipment
Indicon-Tridak	U.S.A.	Encapsulation equipment
Kissel und Wolf	Germany	Printing, handling & encapsulating devices
Lasag	Switzerland	Transfer machines
Norland Inc.	U.S.A.	Soldering and transfer machines
Plasma Technology	U.K.	Cleaning equipment
Sagax Instrument AB	Sweden	Connecting and transfer equipment
Schmid Machines	Switzerland	Printing, handling and marking equipment
Siemens	Germany	Soldering lines
Universal Instruments Corp.	U.S.A.	Printing, burning, handling and trimming machinery
Passive and other components		
Agamice	France	Insertion machinery
Altoflex	France	Interconnecting equipment
CDI	France	Feeders, inserters, solderers and cleaners
Comatel	France	Soldering, wiring and cleaning equipment
Comil	France	Assembly stations
Electro-Outil	France	Insertion equipment
Emile Joly	France	Wiring and assembly equipment
Europrim	France	Feeders, inserters and assemblers
Eurosoft	France	Feeders, inserters and assemblers
Fisa	France	Cleaning equipment
Loupot SA	France	Insertion devices
MJB	France	Feeders, inserters and assemblers
Metalarc	France	Feeding and wiring equipment

Leading Suppliers—Continued

Company	Country of mfgr.	Products
Primelec	France	Feeding, soldering and wiring machines
Sormel	France	Assembly stations
Ste. Electrique Sterling	France	Coil-winding equipment & automatic assembly
Advanced Controls	U.S.A.	PCB fabricators
Autosplice	U.S.A	Microcomponent automatic insertion equipment
Boll	Germany	Assembly stations
Branson Ultrasonics	Netherlands	Assembly and cleaning equipment
Bruckner	Germany	Crimpers
Erem France	Switzerland	Insertion and wiring machines
Ferranti Infographics	U.K.	Image generators
Grassmann	Germany	Interconnecting equipment
Gustav Wirz	Germany	Microcomponent inserters
Iteco	Italy	Assembly centers
Lasag	Switzerland	Fine welders
Nitto Kogyo	Japan	Microcomponent inserters
Proselec	Switzerland	Assembly stations
Pye-Unicam (Philips)	Netherlands	Microcomponent inserters
Siemens	Germany	Assembly centres
Streckfuss France	Germany	Feeding, inserting, wiring and soldering equipment
Systemation	U.S.A.	IC handling equipment and passives assembly
Unilab-Datamation	U.S.A.	Assembly centres
Vogt	Switzerland	Pin inserters
Zevatron France	Germany	Soldering, wiring and assembly equipment
Component test equipment		
Altoflex	France	Monitoring equipment
Atelier Outillage Orleanais	France	Measure and test machinery
CDI	France	Optical testers, test stations & analysers
Codimin	France	Measure and test systems, analyses and control machinery
IMD	France	PCB testers, optical testers and analysers
MJB	France	PCB automation test stations
Nicolet	France	Logic analysers and measuring devices
Primelec	France	Optical test equipment
Arcotronics	Italy	Automatic test equipment
Bosch	Germany	PCB testers
Erem France	Switzerland	Optical test equipment
GenRad	U.S.A.	Test beds
Gyrex Corporation	U.S.A.	Measuring devices
Keithley	U.S.A.	Autotmatic test equipment
Kulicka und Soffa	Switzerland	Test instrumentation
Siemens	Germany	Test beds

Source: International Trade Administration research report.

Best Sales Prospects

Product	Prospective purchasers
Wafer fabrication equipment	Texas/Thomson-CSF/ Motorola/Matra-Harris/ Cogie/Lab Marcoussis/ RTC/SGS-Ates
Semiconductor assembly equipment	Intermetall/Motorola/ Matra-Harris/Westinghouse/ Thomson-CSF/Efcis/RTC/ Texas/TRW
Passive and other components production equipment	Boussois Dan/Ceraver/ Deutsch/Entrelec/ Eurofarad/Fribourg/ ITT/LCC-CICE/Mars-Alcatel/ MCB/Metallo/Nicolitch/Orega/ Perena/Radiall/RTC/Saditel/ SAT/Sfernice/Socapex/ Thomson-CSF
Components test equipment	Audax/CEF/CEPE/CIT-Alcatel/ Connectral/Deutsch/Entrelec/ Eurofarad/ITT/Mars-Alcatel/ LCC-CICE/Metalimphy/Orega/ Portenseigne/Radiall/ Rifa/RTC/SAT/Secre/ Sfernice/Socapex/Thomson-CSF/ Siemens/SIF Safco/Sprague/ UMD Amphenol

Source: International Trade Administration research report.

France: Basic Economic Indicators

Population:	55.061 million (1985)	Major trading partners:	United States, EC, Japan, USSR
GDP:	$495 billion (1984)	Exchange rate:	8.74 francs = US$1 (1984)
Contributions to GDP:	Services 52.2% (1983)	Fiscal year	Calendar year
	Industry 35.3%	Current account balance:	–$0.1 billion (1984)
	Agriculture 5.09%	International reserves:	$42.7 billion (1984)
Per capita income:	$9,001 (1984)	Labor force:	23.6 million (1984)
Inflation rate:	7.4% (1984)	Unemployment:	10.5% (1984)
Exports f.o.b:	$205.4 billion (1984)	Average hourly wage:	$7.42 (1984)
U.S. share:	8.1%		
Imports c.i.f.:	$210.4 billion (1984)		
U.S. share:	7.0%		

Useful Addresses

Embassies

American Embassy
Commercial Section
2 Avenue Gabriel
75382 Paris Cedex 08
Paris
tf: 4296 12 02
tx: 650221

Embassy of France
4101 Reservoir Road, N.W.
Washington, DC 20007
tx: 944-6000

American Chamber of Commerce

21 Avenue George V
75008 Paris
tx: 4724 80 26

Electronics Trade Association

Syndicat des Industries de Composants Electroniques Passifs (SYCEP)
11 rue Hamelin
75016 Paris
tf: 4505 14 27
tx: 611045

Syndicat des Industries de Tubes Electroniques et Semiconducteurs (SITELEST)
11 rue Hamelin
75016 Paris
tf: 4505 14 27
tg: 611045

Technical standards

Centre d'Information sur les Normes et Reglements Techniques (CINORTECH)
Association Francaise de Normalisation (AFNOR)
Tour Europe
CEDEX 7 92080 Paris La Defense
tf: 4778 13 26
tg: afnor courbevoie
tx: 611974 afnor f
tfx: 774 84 90

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Current information on marketing conditions in France is available from:

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Department-sponsored trade shows and other promotional vehicles for electronic components production/test equipment are handled by:

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